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10/611,866

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Chikako Sekiya

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EXAMINER

CROWELL, ANNA M

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 11/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

|                                      |  |  |
|--------------------------------------|--|--|
| <b>Application No.</b><br>10/611,866 | <b>Applicant(s)</b><br>SEKIYA, CHIKAKO |  |
| <b>Examiner</b><br>Michelle Crowell  | <b>Art Unit</b><br>1763                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 September 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 6-8, 11-15, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda et al. (U.S. 2001/0015175) in view of Herchen et al. (U.S. 6,264,852).

Referring to Figures 1, 2, and 9, paragraphs [0059]-[0076], Masuda et al. discloses a plasma treatment apparatus and an upper electrode cover for a plasma treatment apparatus comprising: a vacuum vessel 100 that houses an article W to be plasma-treated in a plasma region (par. [0061]); a lower electrode 130 that is provided inside the vacuum vessel and onto which is placed the article to be plasma-treated (par. [0065]); an upper electrode main body 111 is provided above the lower electrode to form the plasma region in the vacuum vessel, the upper electrode main body having formed therein an opening through which passes light for detecting an extent of progress of plasma treatment of the article to be treated in the plasma region (par.[0063], Fig. 2); an upper electrode cover 115 that is joined to a lower surface of the upper electrode main body and faces the plasma region, the upper electrode cover having formed therein a hole at a location corresponding to the opening of the upper electrode main body (par.[0063], Fig. 2); and a transparent window member 115C that is made of a transparent member which is a separate body to the upper electrode cover, has a shape insertable into the

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hole of the upper electrode cover 115, and is retainably and upwardly removably fitted in the hole of the upper electrode cover (par.[0063]-[0064], Fig. 9), wherein the transparent window member 115C is disposed to face the plasma region and has a part through which the light for detecting an extent of progress of plasma treatment passes (Fig. 9)

Masuda et al. fails to teach that a transparent window member having no through hole in the part through which light passes.

Referring to column 7, line 54-column 9, line 25, Herchen et al. teaches a plasma treatment apparatus wherein a transparent window member 170 has no through hole in the part through which light passes. It is conventionally known in the art that a transparent window member without holes is an alternate and equivalent structure to a transparent window member with holes since both function the same to transmit light. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the transparent window member of Masuda et al. to have no through hole as taught by Herchen et al. since it is an alternate and equivalent structure which functions the same to transmit light.

With respect to claim 3, an upper electrode cover further includes that the hole has a lower portion having a reduced diameter and an upper portion having an increased diameter (Fig. 9, shape of 115C).

With respect to claim 4, an upper electrode cover further includes wherein the hole opens into the plasma region (Fig. 9).

With respect to claim 6, referring to Figures 1, 2, and 9, paragraphs [0059]-[0076], Masuda et al. discloses an upper electrode cover window member for a plasma treatment apparatus comprising: a vacuum vessel 100 that houses an article W to be plasma-treated in a

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plasma region (par. [0061]); a lower electrode 130 that is provided inside the vacuum vessel and onto which is placed the article to be plasma-treated (par. [0065]); an upper electrode main body 111 that is provided above the lower electrode to form the plasma region in the vacuum vessel, the upper electrode main body having formed therein an opening through which passes light for detecting an extent of progress of plasma treatment of the article to be treated in the plasma region (par.[0063], Fig. 2); an upper electrode cover 115 that is joined to a lower surface of the upper electrode main body and faces the plasma region, the upper electrode cover having formed therein a hole at a location corresponding to the opening of the upper electrode main body (par.[0063], Fig. 2); wherein a window member 115C that is made of a transparent member which is a separate body to the upper electrode cover, has a shape insertable into the hole of the upper electrode cover 115, and is retainably and upwardly removably fitted in the hole of the upper electrode cover (par.[0063]-[0064], Fig. 9); and the window member has at least in part a shape complementary to a shape of the hole of the upper electrode cover (Fig. 9), wherein the transparent window member 115C is disposed to face the plasma region and has a part through which the light for detecting an extent of progress of plasma treatment passes (Fig. 9).

Masuda et al. fails to teach that a transparent window member having no through hole in the part through which light passes.

Referring to column 7, line 54-column 9, line 25, Herchen et al. teaches a plasma treatment apparatus wherein a transparent window member 170 has no through hole in the part through which light passes. It is conventionally known in the art that a transparent window member without holes is an alternate and equivalent structure to a transparent window member with holes since both function the same to transmit light. Thus, it would have been obvious to

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one of ordinary skill in the art at the time of the invention to modify the transparent window member of Masuda et al. to have no through hole as taught by Herchen et al. since it is an alternate and equivalent structure which functions the same to transmit light.

With respect to claim 7, an upper electrode cover window member further includes wherein the hole has a lower portion having a reduced diameter and an upper portion having an increased diameter, and the upper electrode cover window member 115C has a lower portion having a reduced diameter and an upper portion having an increased diameter that can be fitted in the lower portion and upper portion of the hole, respectively (Fig. 9, shape of 115C).

With respect to claim 8, Masuda et al. fails to teach the upper electrode cover window member having a lower portion having a reduced diameter, an intermediate portion having an increased diameter, and an upper portion having a reduced diameter; however, the shape of the upper electrode cover window member is considered a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular shape of the upper electrode cover window member was significant (In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)).

With respect to claim 11, a plasma treatment apparatus further comprising a lower electrode 130 that is provided inside the vacuum vessel 100 and onto which is placed the article W to be plasma-treated, and wherein the upper electrode main body 111 is provided above the lower electrode (par. [0061], [0065], Fig. 1).

With respect to claim 12, a plasma treatment apparatus further comprising: a tubular member 141 that is provided in the vacuum vessel 100 with a lower end thereof inserted in the

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opening of the upper electrode main body 111, the tubular member having formed therein an inner hole 144 (par.[0073]-[0074]); and a sensor 152 that detects intensity of light for detecting the extent of progress of the plasma treatment of the article to be plasma-treated, and wherein the light passes through the opening of the upper electrode main body, the inner hole of the tubular member, and the window member (pars. [0067],[0074], [0092]-[0093], Figs. 2 & 7).

With respect to claim 13, a plasma treatment apparatus wherein the sensor detects 152 changes in intensity of light reflected by the article to be plasma-treated, the reflected light from the article to be plasma-treated passing through the window member, the inner hole of the tubular member, and the opening of the upper electrode main body (pars. [0067], [0074], [0092]-[0093], Figs. 2 & 7).

With respect to claim 14, a plasma treatment apparatus as claimed in claim 13, wherein the sensor 152 emits light through the opening of the upper electrode main body, the inner hole of the tubular member, and the window member into the vacuum vessel (pars. [0067], [0074], [0092]-[0093], Figs. 2 & 7).

With respect to claim 15, referring to Figure 2, Masuda discloses a plasma treatment apparatus wherein the window member (portion of 115 with 115B) is in contact with a lower surface of the tubular member 141 (Fig. 2). Alternatively, as shown in other embodiments, it would have been obvious to one of ordinary skill in the art at the time of the invention for the window member 115C of Figure 9 to be in contact with the lower surface of the tubular member 141 in order to further reduce the optical transmission path.

With respect to claim 17, a plasma treatment apparatus wherein the opening of the upper electrode main body 111 has a shape different from the shape of the hole of the upper electrode cover 115C (Fig. 9).

With respect to claim 18, a plasma treatment apparatus wherein the inner hole of the tubular member 141 has a shape different from the shape of the hole of the upper electrode cover 115C (Fig 9).

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda et al. (U.S. 2001/0015175) in view of Herchen et al. (U.S. 6,264,852) as applied to claims 1-4, 6-8, 11-15, and 17-18 above, and further in view of Ueda et al. (J.P. 08107102).

The teachings of Masuda et al. have been discussed above.

Masuda et al. fail to teach that the upper electrode cover is made of quartz.

Referring to the abstract, Ueda et al. teaches that it is conventionally known in the art for the upper electrode cover 14 to be made of quartz in order to reduce particle contamination. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the upper electrode cover of Masuda et al. in view of Herchen et al. to be made of quartz as taught by Ueda et al. in order to reduce particle contamination.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda et al. (U.S. 2001/0015175) in view of Herchen et al. (U.S. 6,264,852) as applied to claims 1-4, 6-8, 11-15, and 17-18 above, and further in view of Okawa et al. (J.P. 2000349070).

US 6,758,941 is used as the English translation for (JP 2000349070).



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The teachings of Masuda et al. in view of Herchen et al. have been discussed above.

Masuda et al. in view of Herchen et al. fail to teach that the upper electrode cover window member is made of quartz.

Referring to column 5, lines 16-22, Okawa et al. teaches the upper electrode cover window member 4C is made of quartz since it is a known transparent material used for plasma monitoring and sapphire is highly resistant to plasma. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the material of the upper electrode cover window member of Masuda et al. in view of Herchen et al. to be made of sapphire as taught by Okawa et al. since it is a known transparent material used for plasma monitoring and sapphire is highly resistant to plasma.

5. Claims 10 and 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda et al. (U.S. 2001/0015175) in view of Herchen et al. (U.S. 6,264,852) as applied to claims 1-4, 6-8, 11-15, and 17-18 above, and further in view of Howald et al. (U.S. 6,074,516).

The teachings of Masuda et al. in view of Herchen et al. have been discussed above.

Masuda et al. in view of Herchen et al. fail to teach that the upper electrode cover window member is made of sapphire.

Referring to column 5, lines 17-30, Howald et al. teaches the upper electrode cover window member 302 is made of sapphire since it is a known transparent material used for plasma monitoring and sapphire is highly resistant to plasma. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the material of the upper electrode cover window member of Masuda et al. in view of Herchen et al. to be made of

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sapphire as taught by Howald et al. since it is a known transparent material used for plasma monitoring and sapphire is highly resistant to plasma.

Masuda et al. fail to teach affixing the window member to the upper electrode cover using tape.

Referring to column 6, lines 59-64, Howald et al. teaches affixing the window member to the upper electrode cover using an adhesive. It is conventionally known in the art that tape is an adhesive. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply tape to upper electrode cover of Masuda in view of Herchen et al. to affix the window member to the upper electrode cover as taught by Masuda et al. since tape is a conventionally known material used to affix a window member.

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

Additionally, applicant has argued that the disk formed conductor 111 of Masuda et al. is different from an upper electrode of a parallel plate plasma processing apparatus; however, an antenna 111 that is coupled to an RF power source 121, 122 (radio waves have a frequency of less than  $3 \times 10^9$  Hz) is indeed an electrode. Additionally, as stated by applicant, Masuda et al. teaches that apparatus can be arranged as a parallel plate plasma processing apparatus and therefore, in order to achieve this arrangement, the antenna would be modified to act as an electrode (par. [0113]). Thus, the apparatus of Masuda et al. in view of Herchen et al. satisfies the claimed requirements.

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Applicant has argued that upper electrode cover of Masuda et al. is different from applicant's invention, since the window member of Masuda et al. has through holes; however, as stated above in the new grounds of rejection, the apparatus of Masuda et al. in view of Herchen et al. teaches an upper electrode cover having a window member without through holes. Thus, the apparatus of Masuda et al. in view of Herchen et al. satisfies the claimed requirements.

Applicant has argued that Masuda et al. fail to teach the plate part 115C is made of transparent member and removably mounted to the plate 115; however, as stated in paragraphs [0064], [0080] (Figs. 2 & 9), the plate 115 (upper electrode cover) which includes the plate part 115C (window member) is made of silicon which is a transparent material. Additionally, as seen in Figure 9, since the plate part 115C (window member) is a separate member from the plate 115 (upper electrode cover) it is capable of being removably mounted. Thus, the apparatus of Masuda et al. in view of Herchen et al. satisfies the claimed requirements.

### ***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (9:30 -6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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